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Nov 21; 51

Dear Mr Strickfaden-

I tried in vain to get you on the phone but no one answered. Hope you are still well and everything is going finely with you.

I am now in my eightieth year and still taking patients. our rent has been raised and we will be compelled to move if we can find a cheaper place. I shall hate it as we have been here for thirteen years and it had grown to seem like home. My five meter ultra short wave(which I call my "VITAL N RMALIZER) Do you know anyone with High Blood-pressure.Thirty two years ago I was running a systolic of over Two hundred. The Met. Life Co rates High Blood pressure as PUBLIC ENEMY NO1 it kills 600,000 annually (more than Cancer and tuberculosis combined I am now running a norm l pressure of about 185 and am feeling very well dispite my age. Are you still doing ELECTRICKS? I have all my tesla apparatus and dont know what to do with it. Do you know anyone who would take it off my hands. We are sadly in need of money and I would sell all my H-F apparatus for fifty dollars. You have no doubt seen the million volt coil which I gave to the Planetarium. Can you not come up and look over my High-frequency "JUNK-PILE". Today Jose Iturbe came in and played for us. He is going to try to sell my piano forme He says "IS A VERY GOOD PIANO" I also want to sell my harp We shallbe very glad to see you again. If this reaches you please call me up

your old High-frequency friend

Frederick F. Strong

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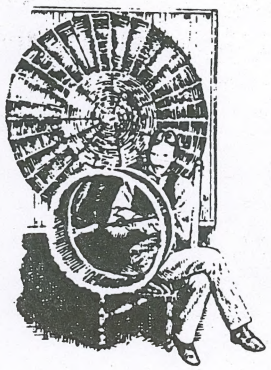

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MR. JEFF BEHARY
TURN OF THE CENTURY ELECTROTHERAPY MUSEUM
627 36TH ST.
WEST PALM BEACH, FL 33407

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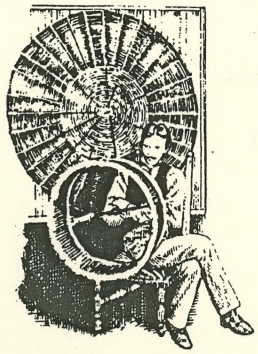

May 27, 2006

Jeff Behary
Turn of the Century Electrotherapy Museum
627 36th St/
West Palm Beach, FL 33407

Jeff Behary,

To begin, allow me to thank you for making the 120' round trip to the mailbox worthwhile. I, too, like to receive mail the old fashioned way. I do, however, acknowledge that modern day technology has its advantages. But when it comes to a choice of communicating, I prefer reading a letter. And even though I consider myself a dinosaur, I do see the necessity for a rapid exchange of information, and the computer comes into its own in this regard.

I would have liked to have known you when I was publishing the TCBA News. We could have benefited from one or two articles on the history of electro-therapy. It's a topic that appeared every once in a while in the newsletter and included some nice illustrations. I made a 20 by 30" blow-up of the cover from the February 1918 Popular Science. It shows a person in military uniform applying power to a huge solenoid with a man sitting inside. It's really an impressive work of art. I also have a similar blow-up of the cover from the March 1925 issue of Experimenter magazine illustrating the high voltage experiment at the University of California. A man is sitting in a tub of water that is connected to a huge Tesla coil. Long tendrils of lightning bolts emerge from his body. He isn't smiling.

Mr. Kinraide must have been an unusual person, a genius in his field of experimentation. The illustrations, and the methods by which they were obtained, were most interesting. I had not seen the Century Magazine article. The only issues I own are those in which Tesla was featured. What was the date of the Kinraide article? I trust that you carry a great deal of satis-faction in owning some of Kinraide's apparatus and glass plate collection. It's something of which to be proud.

Except for the letter Strong sent to Strickfaden, I have nothing that I can offer on the man. You mentioned that you have Strong's book. I assume you are refering to High Frequency Currents? He also wrote Essentials of Modern Electro-therapeutics. It's smaller than High Frequency Currents, only 150 pages but still interesting.

I have only one book by Monell. It was purchased back when those types of literature were being marketed for between $50-75. Since then, I've seen them at paper shows and the prices were between $200-300. Now, as you know, they are beyond reason. It never ceases to amaze me how expensive and item becomes once I find an interest in it. I bought a first edition of Fleming's Wireless Telegraphy for $10. Now, a first edition is $300-500. "Crayzee," ain't it?

I suspect that Ken Strickfaden knew many of the pioneers in electro-tech-nology. It's unfortunate that he is no longer around to pick his brains for information on early developments in the field. Ken was a real talker and could keep a group's attention for as long as he wanted to talk.

Robert Fischer once wrote to me that he met Tesla. He said that Tesla was a quiet man but knew all the answers (when it came to electro-technology). Fischer also said something to the effect that he once worked for McIntosh. I can't recall his exact words but he said he worked long hours and for very little money.

As for Ovington, I can't tell you much more than what was covered in the Strickfaden book. Back in 1954, I received a letter from a man who grew up with Ovington. It was a most interesting communication (6 pages) in which he talked about the old days:

"Tesla was'Nick' to us, for my late father had the pleasant duty to write the checks for his milionaire supporters...I palled with men like Earl Ovington on whose Bleriot Monoplane I installed my own original system using the first counterpoise antenna in 1910 and while Earl soared at some 1500 feet over Mineola-Hempstead we carried on the first two-way radio from plane to ground, I at 'N.Q' in Yonkers, Earl aloft in his 'fly.' He became the First Air Mail Pilot. He was a millionaire's son and a close friend of Tesla. Earl would put on spectacular displays of fire works using a huge Tesla coil mounted on a platform over the crows at Old Madison Square Garden, and as he would let me to venture forth on the glass platform take big sparks of terrifying length off a wand that I held in my hand ...I soon found that we had a daily matinee and evening show here for the electrical show duration and attracted vast crowds who expected to see us become electrocuted. Earl was a show-off and he loved it...Tesla would stand by with a paternal eye on us both...."

One of the amazing things about the letter is the names of prominent people with whom he rubbed elbows(J.P. Morgan, Edwin H. Armstrong,etc.). This man was in the thick of the romantic era of a developing nation (wireless telegraphy, formation of large corporations, famous entrepreneurs, and so on). I wish I could have met him in person and picked his brains, He sounded to me like a person who loved reminiscing about the "ole days."

You apoke about flat spiral high frequency coils. This form of construction was Tesla's favorite. There are photos of his Long Island Lab showing huge flat spiral transformers hanging on the wall and from the ceiling. I believe he planned to use them as magnifiers for his Long Island Plant.

I've always been intrigued by this form of coil and had built one 6' in diameter when living in Glens Falls. I had no place to test it except outdoors. But before I could see what it would do, the Urban Renewal program took my property (and I was happy to get rid of it). We had to move in the winter so I left my lab apparatus in the garage. The house was scheduled to be demolished in June so I returned in May to pick up my collection. Much to my dismay, the house and garage (one car) was gone and so was my equipment. I cried. When we arrived here, I started building another 6' diameter spiral but never completed it. I'm going to build a smaller unit as my lab is too small for anything larger. It's one of those "someday" projects.

And in speaking of flat spirals, I'm reminded that Dr. W.H. Guilleminot liked flat spirals (see enclosure). Sampson claimed the flat spiral was a "typical Oudin coil." I don't know where he got that information as all I have been able to find about Oudin is his series connected high frequency coil. I have an article in French dated August 1893 in which Oudin announced his series-connected coil. What the world forgot to notice is Tesla's lecture of February 1893, some 6 months ahead of Oudin. If you have T.C. Martin's THE INVENTIONS, RESEARCHES, AND WRITINGS OF NIKOLA TESLA, look at Fig. 184 on page 344 and you'l see the Tesla series-connected coil which Oudin invented six months later! So much for historical fact.

About your newly designed capacitor, it sounds absolutely intriguing. And thank you for allowing me to review Crookes letter to Tesla. Talk about historical excitement....!

As for my collection, it's for sale but I can't claim that it contains unique or exotic apparatus which would enhance a museum. The good stuff (original T coil in rosin and beeswax, etc.) I'm sorry to say I sold long ago. I wish I didn't as there were a couple of real treasures in the sale. At this time in my life, I would (as Strong desired)want to sell the complete collection (if you can call it a collection). I can think of (maybe) two or three items that are of museum quality and working. The others are just sitting around waiting to be restored (probably never happen). If I can't find a buyer then I think I would do the unthinkable and sell the spark gaps on eBay. I see that in some cases, the spark gaps fetch more than the machines from which they came. I recently bought a junker (paid more than its worth) just for some experimentation (and the four spark gaps). I'll probably dismantle it and rewire the connections as the conductors are crumbling, and then make a Tesla coil out of it. The spark gaps are worth more than I paid for the unit.

And in speaking of Strong's wanting to sell his equipment to Ken, I wonder if his Hercules machine was included? His asking price was $50. How tempting!

"Bovie machines?" Don't think I've ever seen one. But perhaps I have and just didn't recognize it's source of manufacture.

Bill Wysock was highly critical of the Strickfaden book. He expected his name to appear on more of its pages than shown. Bill never thanked me for inviting him to take part in the project, just criticized. I will refrain from further comment even though I could say more.

And in speaking of the Strickfaden book, check out Abe Books if you want to get an "Oh my God" reaction. One book store in Ithaca, NY has several copies for sale for $56.95 (wow!) and a book store owner in New Jersey is asking in the $88 range (a capital WOW!). Shouldn't a book of this value be on the top ten trade paperback list? Another "Crayzee" (add another "e").

A pole transformer on a plane? You must be exceptionally strong! I've never had the hankering to power a coil with a pole transformer. First of all, I couldn't run a coil that large in my lab and secondly, knowing my tendency to get a bit careless at times it is better that I avoid this level of coiling. One mistake and it's farewell to this earth. I'm sure you would enjoy attending Ed Wingate's Teslathon in Brockport, NY (a few minutes from Rochester). There is an amazing array of demonstrations by attendees ranging from pole transformer levels to small coils that fit in a small portable case. Ed will be happy to let you stand in his (Faraday)"Cage of Death." Back in the 60s, I constructed one for my science classes. It really caught the attention of my students (who, at first, were reluctant to sit inside but later fought to be the first when they fully understood Faraday's principle).

Among the enclosures is a copy of the Strong letter to Ken Strickfaden aaccompanied with a permission to display announcement. If I can be of further assistance, let me know what you need.

With best wishes from the lab,

Harry Goldman

Harry Goldman

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Popular Science

Founded MONTHLY

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See page 210

HOWARD BROWN

Essentials of Modern Electro-Therapeutics

An Elementary Text-Book on the Scientific Therapeutic Use of Electricity and Radiant Energy

Second Edition. Rewritten and Enlarged

by

Frederick Finch Strong, M.D.

Lecturer in Electro-Therapeutics at Tufts College Medical School, Boston

102 Illustrations in the Text

NEW YORK

REBMAN COMPANY

141 West 36th Street

HANDBOOK

OF

Electricity in Medicine

BY

DR. W. H. GUILLEMINOT
(Paris)

TRANSLATED BY

W. DEANE BUTCHER, M.R.C.S.
Surgeon to the
London Skin Hospital

With Eight Plates in Colours and Seventy-nine Illustrations

NEW YORK
REBMAN COMPANY
1123 BROADWAY

1906

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129 SHAFTESBURY AVENUE

When the lower end of the helix was connected to the other end of the self-induction coil the effects were improved, and these were still better when the self-induction coil was

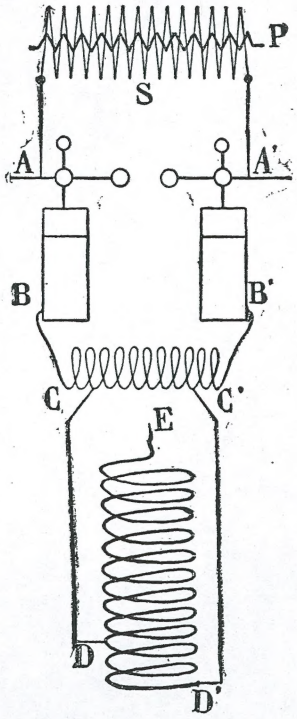


Fig. 25.—Oudin's unipolar resonator.

entirely suppressed. This is the form ultimately adopted by *Oudin.* (Fig. 25.)

The improved form of *Oudin's* resonator is therefore a helix of copper wire 2½ mm. in diameter, consisting of 50 turns with a distance of 8 mm. between each turn.

In this helix the current due to the discharge of the

Leyden jars circulates through three or four of the lowest coils. Phenomena both of induction and of resonance result; induction effects due to the influence of the lower coils on the upper portion of the helix, and resonance effects in the upper portion.

This phenomenon of reinforcement is called resonance from its analogy with acoustic resonance, since the quantity of the effleuve may be increased by tuning the helix to correspond with the exciting coil. This is done by adjusting its coefficient of self-induction.

135. **Guilleminot's flat spirals for high frequency.**—In-

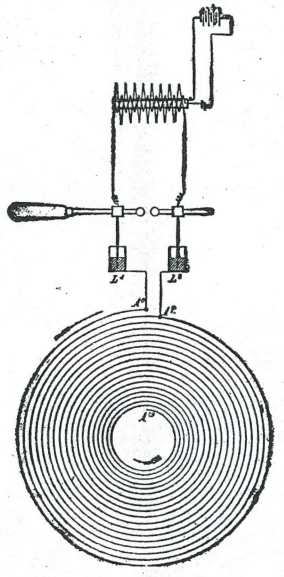


Fig. 26.—Guilleminot's high frequency spiral.

stead of a helix we may use a flat spiral.[1] The author's form of spiral resonator is so constructed that the excitation is

[1] H. Guilleminot, Archives d'electricité Médicale, 1901, No. 287.

Electrical Oscillators

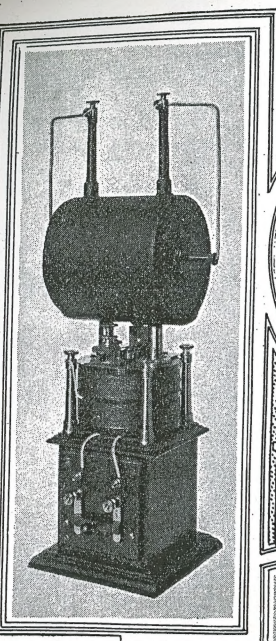


Fig. 1. Oscillator with detachable transformer for experimental purposes

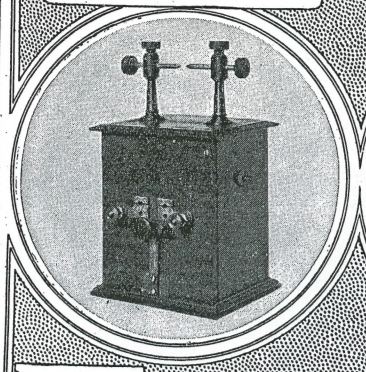


Fig. 2. Small Tesla Coil for gas engine ignition and similar uses

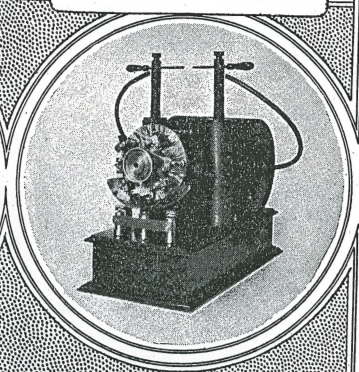


Fig. 3. Tesla Transformer, 12 inch spark, chiefly for wireless

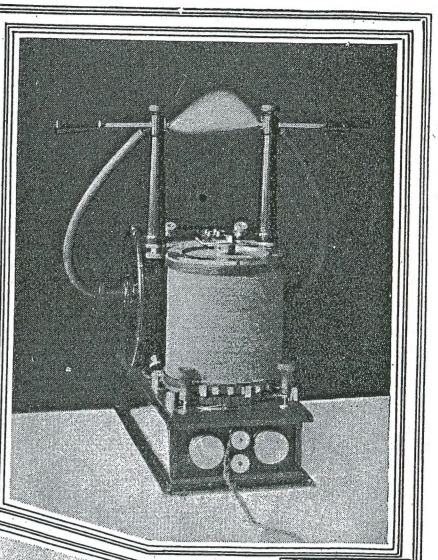


Fig. 4. Tesla Oscillator in action, generating undamped waves

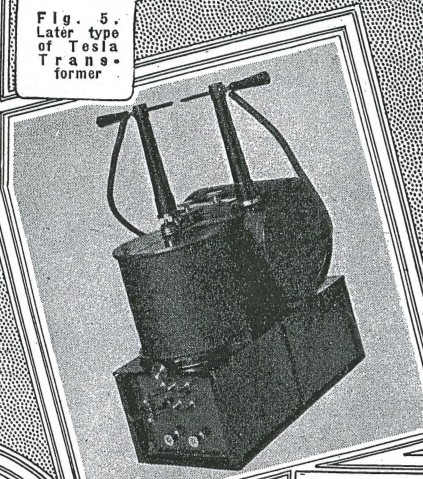


Fig. 5. Later type of Tesla Transformer

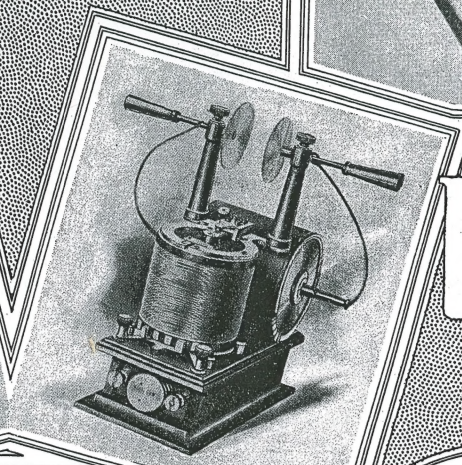


Fig. 6. Small oscillator for production of ozone

Fig. 7. Large Tesla Transformer for various purposes

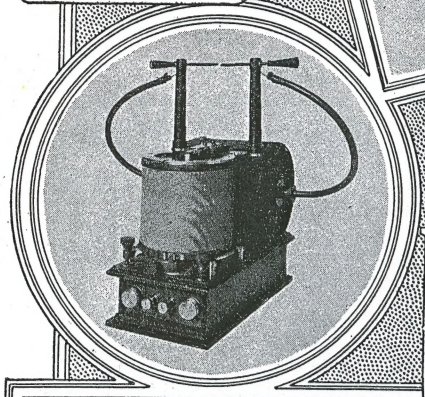


Fig. 8. Tesla Transformer with rotary break for wireless

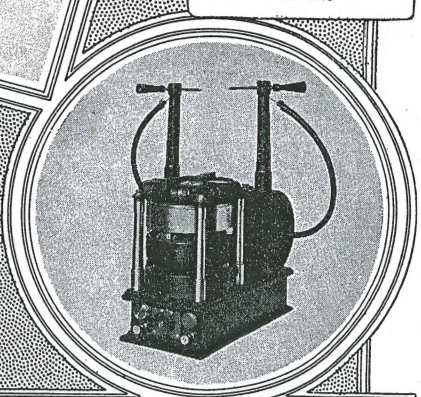


Fig. 9. Tesla Transformer with mercury interrupter

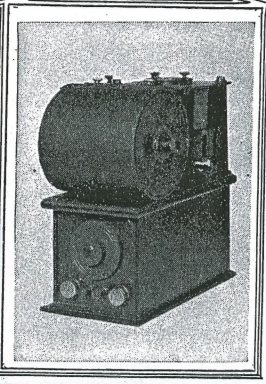
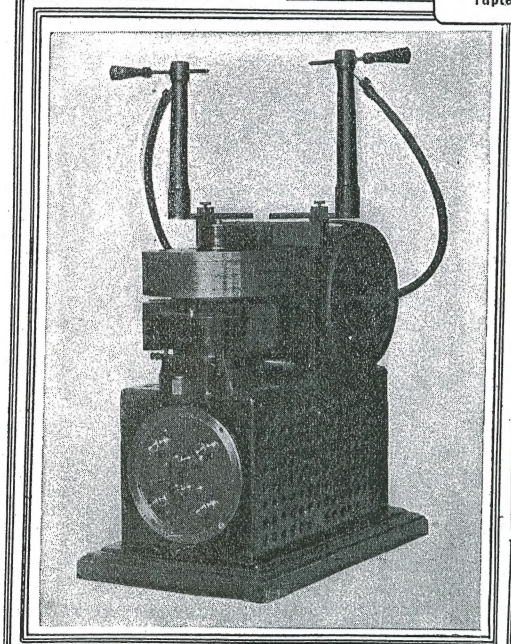


Fig. 10. Large Tesla Transformer with hermetically sealed mercury interrupter

Fig. 12. Another type of Tesla Transformer with sealed mercury interrupter



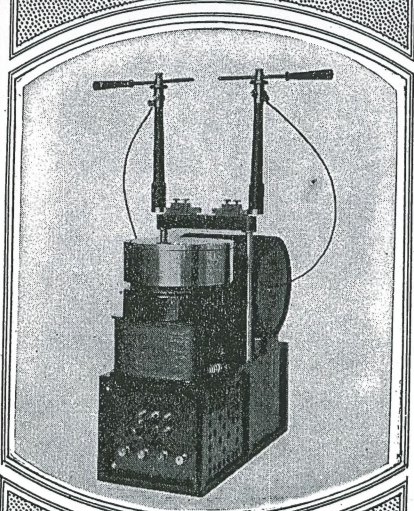
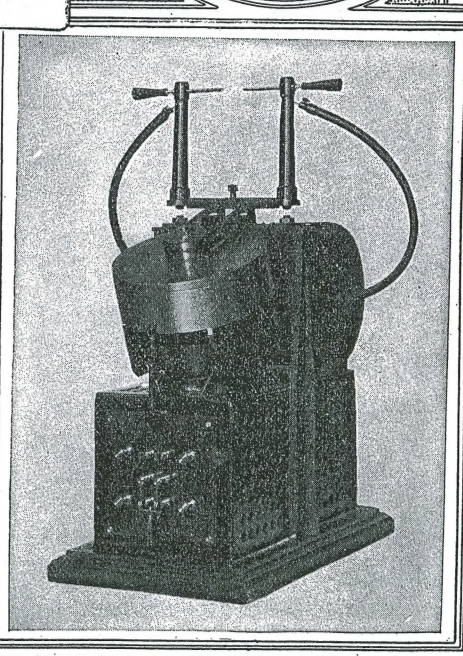


Fig. 11. Tesla Transformer with sealed mercury interrupter for low tension work



Electrical Oscillators

By NIKOLA TESLA

FEW fields have been opened up the exploration of which has proved as fruitful as that of high frequency currents. Their singular properties and the spectacular character of the phenomena they presented immediately commanded universal attention. Scientific

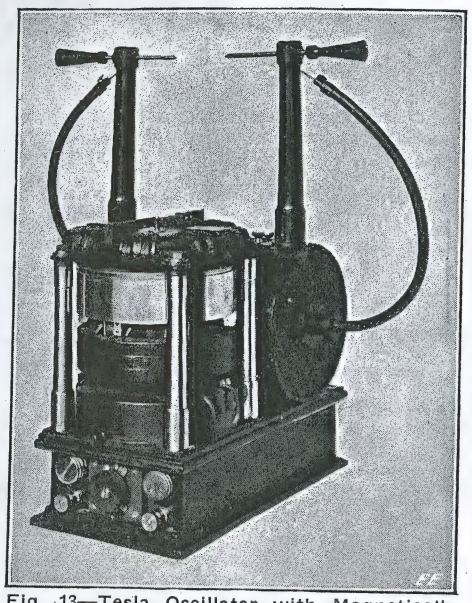


Fig. 13—Tesla Oscillator with Magnetically Controlled, Sealed Mercury Interrupter.

men became interested in their investigation, engineers were attracted by their commercial possibilities, and physicians recognized in them a long-sought means for effective treatment of bodily ills. Since the publication of my first researches in 1891, hundreds of volumes have been written on the subject and many invaluable results obtained thru the medium of this new agency. Yet, the art is only in its infancy and the future has incomparably bigger things in store.

From the very beginning I felt the necessity of producing efficient apparatus to meet a rapidly growing demand and during the eight years succeeding my original announcements I developed not less than fifty types of these transformers or electrical oscillators, each complete in every detail and refined to such a degree that I could not materially improve any one of them today. Had I been guided by practical considerations I might have built up an immense and profitable business, incidentally rendering important services to the world. But the force of circumstances and the ever enlarging vista of greater achievements turned my efforts in other directions. And so it comes that instruments will shortly be placed on the market which, oddly enough, were perfected twenty years ago!

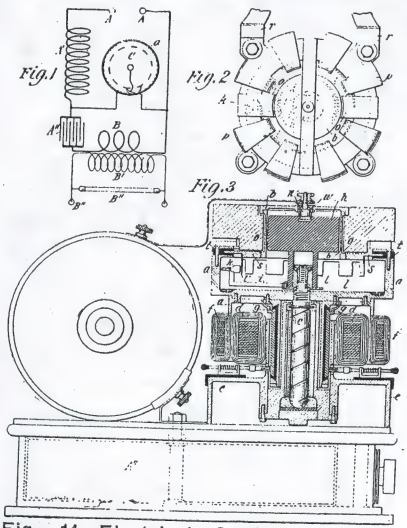


Fig. 14—Electrical Oscillator, Illustrated in Fig. 13, Showing Details and Circuit Connections.

MR. TESLA makes a very important contribution to the electrical arts with this article.

The pioneer of all high frequency apparatus divulges much that is new and startling in these pages. Few people realize the enormous value of Mr. Tesla's machines and the many different important uses to which they can be applied in our everyday lives. New and startling uses are being found every year for these machines.

It is characteristic of Mr. Tesla that he has developed and actually built an astounding variation of these machines, and we regret that we can publish only a very few of the more important models.

Most of the Tesla coils shown have never been publisht before. —EDITOR.

These oscillators are expressly intended to operate on direct and alternating lighting circuits and to generate damped and undamped oscillations or currents of any frequency, volume and tension within the widest limits. They are compact, self-contained, require no care for long periods of time and will be found very convenient and useful for various purposes as, wireless telegraphy and telephony; conversion of electrical energy; formation of chemical compounds thru fusion and combination; synthesis of gases; manufacture of ozone; lighting; welding; municipal, hospital, and domestic sanitation and sterilization, and numerous other applications in scientific laboratories and industrial institutions. While these transformers have never been described before, the general principles underlying them were fully set forth in my publisht articles and patents, more particularly those of September 22, 1896, and it is thought, therefore, that the appended photographs of a few types, together with a short explanation, will convey all the information that may be desired.

The essential parts of such an oscillator are: a condenser, a self-induction coil for charging the same to a high potential, a circuit controller, and a transformer which is energized by the oscillatory discharges of the condenser. There are at least three, but usually four, five or six, circuits in tune and the regulation is effected in several ways, most frequently merely by means of an adjusting screw. Under favorable conditions an efficiency as high as 85% is attainable, that is to say, that percentage of the energy supplied can be recovered in the secondary of the transformer. While the chief virtue of this kind of apparatus is obviously due to the wonderful powers of the condenser, special qualities result from concatenation of circuits under observance of accurate harmonic relations, and minimization of frictional and other losses which has been one of the principal objects of the design.

(*Continued on page 259*)

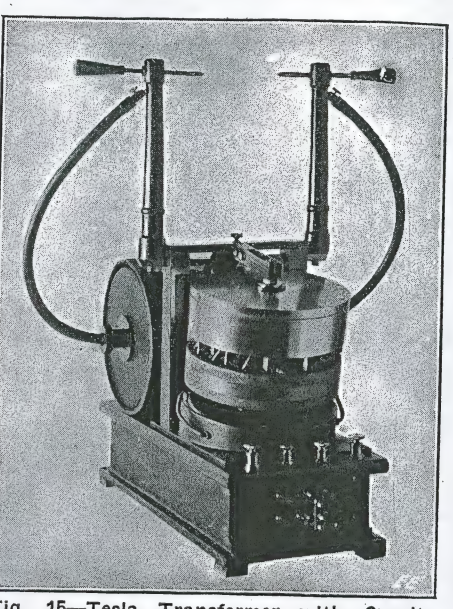


Fig. 15—Tesla Transformer with Gravity Controlled, Sealed Mercury Interrupter.

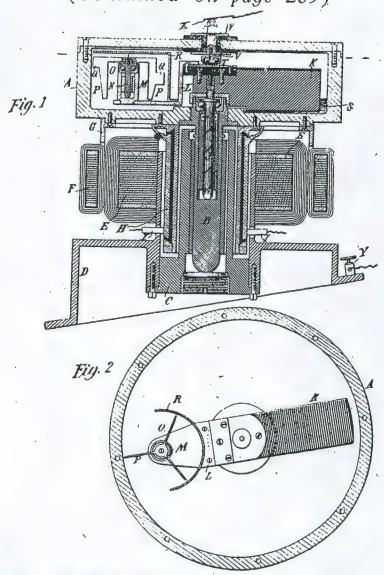


Fig. 16—Electrical Oscillator, Illustrated in Fig. 15, Showing Details of Motor and Break Mechanism.

SPECIAL NOTICE

Last month we announced another special feature article by Mr. Tesla, which altho made in good faith by us was not authorized by him. Due to very important duties of Mr. Tesla, it was impossible for him to furnish his historical article this month, so the special feature article publisht on this page takes its place. An important historical article will appear in the August issue.—Editor.

Electrical Oscillators

By Nikola Tesla

(Continued from page 229)

Broadly, the instruments can be divided into two classes: one in which the circuit controller comprises solid contacts, and the other in which the make and break is effected by mercury. Figures 1 to 8, inclusive, belong to the first, and the remaining ones to the second class. The former are capable of an appreciably higher efficiency on account of the fact that the losses involved in the make and break are reduced to the minimum and the resistance component of the damping factor is very small. The latter are preferable for purposes requiring larger output and a great number of breaks per second. The operation of the motor and circuit controller of course consumes a certain amount of energy which, however, is the less significant the larger the capacity of the machine.

In Fig. 1 is shown one of the earliest forms of oscillator constructed for experimental purposes. The condenser is contained in a square box of mahogany upon which is mounted the self-induction or charging coil wound, as will be noted, in two sections connected in multiple or series according to whether the tension of the supply circuit is 110 or 220 volts. From the box protrude four brass columns carrying a plate with the spring contacts and adjusting screws as well as two massive terminals for the reception of the primary of the transformer. Two of the columns serve as condenser connections while the other pair is employed to join the binding posts of the switch in front to the self-inductance and condenser. The primary coil consists of a few turns of copper ribbon to the ends of which are soldered short rods fitting into the terminals referred to. The secondary is made in two parts, wound in a manner to reduce as much as possible the distributed capacity and at the same time enable the coil to withstand a very high pressure between its terminals at the center, which are connected to binding posts on two rubber columns projecting from the primary. The circuit connections may be slightly varied but ordinarily they are as diagrammatically illustrated in the ELECTRICAL EXPERIMENTER for May on page 89, relating to my oscillation transformer photograph of which appeared on page 16 of the same number. The operation is as follows: When the switch is thrown on, the current from the supply circuit rushes thru the self-induction coil, magnetizing the iron core within and separating the contacts of the controller. The high tension induced current then charges the condenser and upon closure of the contacts the accumulated energy is released thru the primary, giving rise to a long series of oscillations which excite the tuned secondary circuit.

This device has proved highly serviceable in carrying on laboratory experiments of all kinds. For instance, in studying phenomena of impedance, the transformer was removed and a bent copper bar inserted in the terminals. The latter was often replaced by a large circular loop to exhibit inductive effects at a distance or to excite resonant circuits used in various investigations and measurements. A transformer suitable for any desired performance could be readily improvised and attached to the terminals and in this way much time and labor was saved. Contrary to what might be naturally expected, little trouble was experienced with the contacts, altho the currents thru them were heavy, namely, proper conditions of resonance existing, the great flow occurs only when the circuit is closed

nally I employed platinum and iridium tips but later replaced them by some of meteorite and finally of tungsten. The last have given the best satisfaction, permitting working for hours and days without interruption.

Fig. 2 illustrates a small oscillator designed for certain specific uses. The underlying idea was to attain great activities during minute intervals of time each succeeded by a comparatively long period of inaction. With this object a large self-induction and a quick-acting break were employed owing to which arrangement the condenser was charged to a very high potential. Sudden secondary currents and sparks of great volume were thus obtained, eminently suitable for welding thin wires, flashing lamp filaments, igniting explosive mixtures and kindred applications. The instrument was also adapted for battery use and in this form was a very effective igniter for gas engines on which a patent bearing number 609,250 was granted to me August 16, 1898.

Fig. 3 represents a large oscillator of the first class intended for wireless experiments, production of Röntgen rays and scientific research in general. It comprises a box containing two condensers of the same capacity on which are supported the charging coil and transformer. The automatic circuit controller, hand switch and connecting posts are mounted on the front plate of the inductance spool as is also one of the contact springs. The condenser box is equipt with three terminals, the two external ones serving merely for connection while the middle one carries a contact bar with a screw for regulating the interval during which the circuit is closed. The vibrating spring itself, the sole function of which is to cause periodic interruptions, can be adjusted in its strength as well as distance from the iron core in the center of the charging coil by four screws visible on the top plate so that any desired conditions of mechanical control might be secured. The primary coil of the transformer is of copper sheet and taps are made at suitable points for the purpose of varying, at will, the number of turns. As in Fig. 1 the inductance coil is wound in two sections to adapt the instrument both to 110 and 220 volt circuits and several secondaries were provided to suit the various wave lengths of the primary. The output was approximately 500 watt with damped waves of about 50,000 cycles per second. For short periods of time undamped oscillations were produced in screwing the vibrating spring tight against the iron core and separating the contacts by the adjusting screw *which also performed the function of a key.* With this oscillator I made a number of important observations and it was one of the machines exhibited at a lecture before the New York Academy of Sciences in 1897.

Fig. 4 is a photograph of a type of transformer in every respect similar to the one illustrated in the May, 1919, issue of the ELECTRICAL EXPERIMENTER to which reference has already been made. It contains the identical essential parts, disposed in like manner, but was specially designed for use on supply circuits of higher tension, from 220 to 500 volts or more. The usual adjustments are made in setting the contact spring and shifting the iron core within the inductance coil up and down by means of two screws. In order to prevent injury thru a short-circuit, fuses are inserted in the lines. The instrument was photographed in action, generating undamped oscillations from a 220 volt lighting circuit.

Fig. 5 shows a later form of transformer principally intended to replace Rhumkorf coils. In this instance a primary is employed, having a much greater number of turns and the secondary is closely linked with the same. The currents developed in the latter, having a tension of from 10,000 to 30,000 volts, are used to charge con-

(*Continued on page 276*)

Electrical Oscillators

By Nikola Tesla

(*Continued from page 260*)

densers and operate an independent high frequency coil as customary. The controlling mechanism is of somewhat different construction but the core and contact spring are both adjustable as before.

Fig. 6 is a small instrument of this type, particularly intended for ozone production or sterilization. It is remarkably efficient for its size and can be connected either to a 110 or 220 volt circuit, direct or alternating, preferably the former.

In Fig. 7 is shown a photograph of a

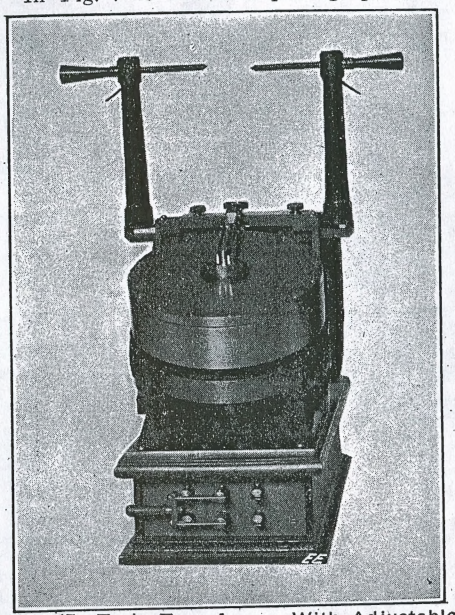


Fig. 17. Tesla Transformer With Adjustable Mercury Controller.

larger transformer of this kind. The construction and disposition of the parts is as before but there are two condensers in the box, one of which is connected in the circuit as in the previous cases, while the other is in shunt to the primary coil. In this manner currents of great volume are produced in the latter and the secondary effects are accordingly magnified. The introduction of an additional tuned circuit secures also other advantages but the adjustments are rendered more difficult and for this reason it is desirable to use such an instrument in the production of currents of a definite and unchanging frequency.

Fig. 8 illustrates a transformer with rotary break. There are two condensers of the same capacity in the box which can be connected in series or multiple. The charging inductances are in the form of two long spools upon which are supported the secondary terminals. A small direct current motor, the speed of which can be varied within wide limits, is employed to drive a specially constructed make and break. In other features the oscillator is like the one illustrated in Fig. 3 and its operation will be readily understood from the foregoing. This transformer was used in my wireless experiments and frequently also for lighting the laboratory by my vacuum tubes and was likewise exhibited at my lecture before the New York Academy of Sciences above mentioned.

Coming now to machines of the second class, Fig. 9 shows an oscillatory transformer comprising a condenser and charging inductance enclosed in a box, a transformer and a mercury circuit controller, the latter being of a construction described for the first time in my patent No. 609,251 of August 16, 1898. It consists of a motor driven hollow pulley containing a small quantity of mercury which is thrown out-

centrifugal force and entrains a contact wheel which periodically closes and opens the condenser circuit. By means of adjusting screws above the pulley, the depth of immersion of the vanes and consequently, also, the duration of each contact can be varied at desire and thus the intensity of the effects and their character controlled. This form of break has given thoro satisfaction, working continuously with currents of from 20 to 25 amperes. The number of interruptions is usually from 500 to 1,000 per second but higher frequencies are practicable. The space occupied is about 10″ x 8″ x 10″ and the output approximately ½ K.W.

In the transformer just described the break is exposed to the atmosphere and a slow oxidation of the mercury takes place. This disadvantage is overcome in the instrument shown in Fig. 10, which consists of a perforated metal box containing the condenser and charging inductance and carrying on the top a motor driving the break, and a transformer. The mercury break is of a kind to be described and operates on the principle of a jet which establishes, intermittently, contact with a rotating wheel in the interior of the pulley. The stationary parts are supported in the vessel on a bar passing thru the long hollow shaft of the motor and a mercury seal is employed to effect hermetic closure of the chamber enclosing the circuit controller. The current is led into the interior of the pulley thru two sliding rings on the top which are in series with the condenser and primary. The exclusion of the oxygen is a decided improvement, the deterioration of the metal and attendant trouble being eliminated and perfect working conditions continuously maintained.

Fig. 11 is a photograph of a similar oscillator with hermetically inclosed mercury break. In this machine the stationary parts of the interrupter in the interior of the pulley were supported on a tube thru which was led an insulated wire connecting to one terminal of the break while the other was in contact with the vessel. The sliding rings were, in this manner, avoided and the construction simplified. The instrument was designed for oscillations of lower tension and frequency requiring primary currents of comparatively smaller amperage and was used to excite other resonant circuits.

Fig. 12 shows an improved form of oscillator of the kind described in Fig. 10, in which the supporting bar thru the hollow motor shaft was done away with, the device pumping the mercury being kept in position by gravity, as will be more fully explained with reference to another figure. Both the capacity of the condenser and primary turns were made variable with the view of producing oscillations of several frequencies.

Fig. 13 is a photographic view of another form of oscillatory transformer with hermetically sealed mercury interrupter, and Fig. 14 diagrams showing the circuit connections and arrangement of parts reproduced from my patent, No. 609,245, of August 16, 1898, describing this particular device. The condenser, inductance, transformer and circuit controller are disposed as before, but the latter is of different construction, which will be clear from an inspection of Fig. 14. The hollow pulley *a* is secured to a shaft *c* which is mounted in a vertical bearing passing thru the stationary field magnet *d* of the motor. In the interior of the vessel is supported, on frictionless bearings, a body *h* of magnetic material which is surrounded by a dome *b* in the center of a laminated iron ring, with

p. The ring is supported on four columns and, when magnetized, keeps the body *h* in position while the pulley is rotated. The latter is of steel, but the dome is preferably made of German silver burnt black by acid or nickeled. The body *h* carries a short tube *k* bent, as indicated, to catch the fluid as it is whirled around, and project it against the teeth of a wheel fastened to the pulley. This wheel is insulated and contact from it to the external circuit is established thru a mercury cup. As the pulley is rapidly rotated a jet of the fluid is thrown against the wheel, *thus making and breaking contact about* 1,000 *times per second.* The instrument works silently and, owing to the absence of all deteriorating agents, keeps continually clean and in perfect condition. The number of interruptions per second may be much greater, however, so as to make the currents suitable for wireless telephony and like purposes.

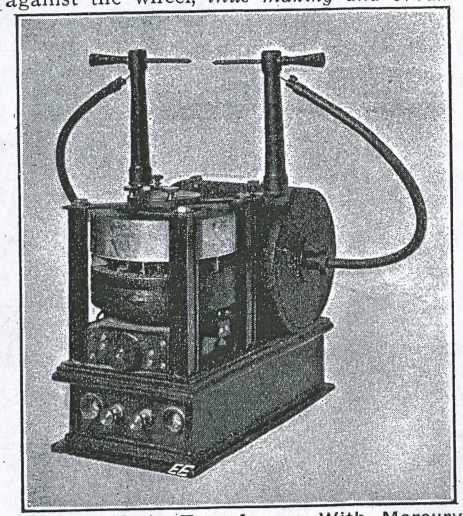


Fig. 18. Tesla Transformer With Mercury Jet Interrupter.

A modified form of oscillator is represented in Figs. 15 and 16, the former being a photographic view and the latter a diagrammatic illustration showing the arrangement of the interior parts of the controller. In this instance the shaft *b* carrying the vessel *a* is hollow and supports, in frictionless bearings, a spindle *j* to which is fastened a weight *k*. Insulated from the latter, but mechanically fixt to it, is a curved arm L upon which is supported, freely rotatable, a break-wheel with projections QQ. The wheel is in electrical connection with the external circuit thru a mercury cup and an insulated plug supported from the top of the pulley. Owing to the inclined position of the motor the weight *k* keeps the break-wheel in place by the force of gravity and as the pulley is rotated the circuit, including the condenser and primary coil of the transformer, is rapidly made and broken.

Fig. 17 shows a similar instrument in which, however, the make and break device is a jet of mercury impinging against an insulated toothed wheel carried on an insulated stud in the center of the cover of the pulley as shown. Connection to the condenser circuit is made by brushes bearing on this plug.

Fig. 18 is a photograph of another transformer with a mercury circuit controller of the wheel type, modified in some features on which it is unnecessary to dwell.

These are but a few of the oscillatory transformers I have perfected and constitute only a small part of my high frequency apparatus of which I hope to give a full description, when I shall have freed myself of pressing duties, at some future date.

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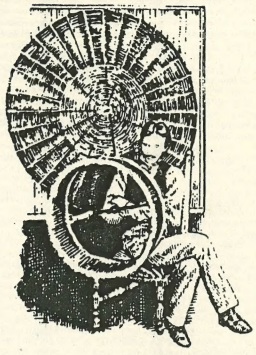

May 16, 2006

Mr. Jeff Behary
Turn of the Century Electrotherapy Museum
627 36th St.
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J.B.,

This is in reply to your (undated) correspondence regarding Frederick Finch Strong's letter to Ken Strickfaden which appears in my bio on Ken. I am very happy that you like the book and wish to display Strong's letter in your museum. If you are thinking of copying the letter from the book to be put on display, then you should contact McFarland Publishers, Box 611, Jefferson, NC 28640. They would be concerned as to the purpose of display such as will there be any commercial gain made by its possession. Of course, you would have to display the source giving proper credits, etc.

If just any copy would suffice, I could provide a photocopy of the original (which by the way was in poor condition. I had to do a lot of cleaning up in order to get it into the book). And here, too, I would expect proper credit as to where you got it and who gave you permission to use it eg. "From the Harry Goldman collection, by permission." If you wish to receive a copy in this manner, I would have to be assurred that you are not going to use it for commercial or financial gain. Please put that in writing.

The Strickfaden book has received much support from the technical and movie people. A reader who purchased it on Amazon gave it a five-star rating. It was nominated for Rondo Hatton's "Best Book of 2005." Unfortunately, the book came out too late in the year to gain momentum, and didn't hit the book stores until February. The only downer I know of is Sean Plummer's review in the March issue of Rue Morgue who concluded it was not worth writing. His was not a review as he didn't describe the pluses (photos, anecdotes, indices which appear in print for the first time). I think he just didn't like it the moment he looked at the cover.

In regard to Ovington, I believe that I printed* an excerpt from a long letter from a man who knew him personally and who worked for J.P. Morgan. I'd have to look it up in my files which are stored away in the barn. As I recall, he told about Ovington's Madison Square Garden shows and how he and Ovington carried out the first wireless transmission from an airplane. I think it was Ovington's father who was an accoutant with some industrail firm. But I could tell more about it if I can find it. I don't recall any other info about Ovington's coils in the letter.

I'm happy to know that Kinraide's legacy will not go the way of Ken Strickfaden's—that it is saved and will be put on display (for the public to see, I hope). And even more good news is that you are also acquiring the H.G. Fischer archives. Will all these, and with what you already have, you have control over the destiny of a lot of history. Congratulations.

I believe that somewhere in my files are two letters from a Robert Fischer, a man who met Tesla and was in the electro-therapeutic business. Would he be a relative to H.G.?

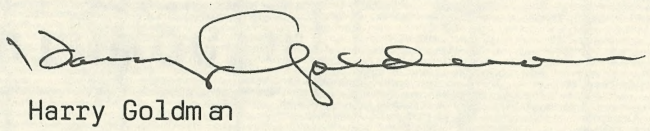
* TCBA News

Anyway, there are several good museums who display their artifacts to the public. I'm sure you are aware of the the Bakken Museum. The Bellingham Radio Museum in Washington has some nice electrical and medical-electrical artifacts. The Pavek (spelling?) Museum has some nice displays. These are available to the public, not like the Museum of Natural History in New York or even the Smithsonian. You donate something to them and it's gone.

A fellow in the west once called me about buying my small collection of electro-medical apparatus. He told me that he was going to get in touch with you and then back to me. Apparently, his intentions cooled a bit after that. I only have a few working items in museum condition, the rest require restoring (which I probably will never get to) or are good for parts. Actually, I've come to the conclusion that one can get more money selling components from the machines rather than the entire apparatus when offering it on eBay. I saw where one machine went for less than $75 but when, for example, the spark gap assembly was sold from a similar machine, the price was around $255. Doesn't make sense, or does it. I once bought a junker by overpaying its worth. After that, someone contacted me and offered well over $200 for the spark gap. It was an eye-opener for me.

The young man you met was not my son but my nephew Ed Aronson. Ed passed away this past year. He was a brilliant technician but you wouldn't know it by his appearance. I recall one story coming out of the aerospace program where a program was delayed because of a glitch in the wiring. They called Ed in and he had it cleared up in a very short time. Ed and I had a ball trying to figure out Tesla coils. Those were the days when you had to resolve problems on your own because coilers were very secretive about keeping the information to themselves. They were afraid that someone would take credit for their ideas. That all changed when I began publishing TCBA News. Some of the most knowledgeable coilers in the country shared information with the rest of us.

Again, congratulations on your recent acquisitions. I wish you the best of success with your museum project.



Harry Goldman

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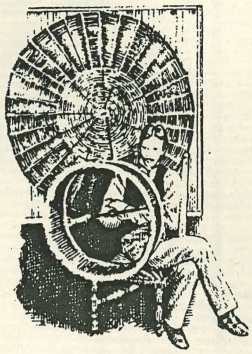

July 5, 2006

Jeff Behary,

First, I must acknowledge the fine batch of photos you had previously sent. Very impressive. You certainly have a handle on high frequency/high voltage apparatus.

Secondly, I'm happy to know that I made your day, re: page 181 of the book showing the Vulcan high frequency coils. Ken Strickfaden had a pair of coils that look to me to be similar, if not, the same type of equipment. Enclosed is a photo of what appears to be the Vulcan apparatus.

Also, a 3" spark from a violet ray machine? That's about the best I've seen from one of those types of electrical machines. I'll have to double-up on one of my old machines and see what gives. I have a few empty cases which I can insert a Tesla coil of my own making. More later on this one.

The latest drawings of Tesla's oscillators are indeed facinating. One thing I've never seen was an actual photo of the Tesla coil itself (inside the drum). I've seen diagrams and patent drawings but they only show the principle, not the actual construction, # Of turns, primary, sec., etc.

F.F. Strong did not have a good grasp of grammar, punctuation, or typing skills. Yes, he did misspell Iturbi but heck, that's what makes his letters unique. By the way, I recall that Iturbi appeared with the Philadelphia Orchestra at Saratoga (just a half-hour away) some years ago. I'm sure you know that he appeared in several movies. Nice going on finding the autograph and record.

I believe Gary Peterson made mention of the forthcoming 150th birthday lectures but I do not recall any of the details. I'm sure you would be a positive addition to the program. Keep me informed of the event. My contribution will be to energize a table-top on the midnight of July 9-10 in honor of Nick.

I don't mind supplying copies of the Tesla Oscillators article with the copier in the color mode. Trouble is, the magazine is buried and I have to move a lot of records to get to it. If I don't include them here, then they will be sent at some future time. It will be interesting to know if these copies show any more detail.

If I can find it, I'd like to know if you have any idea how a fellow made a spark gap from a bulb. The article doesn't provide any data.

Harry Goldman